Richmond Birdwing (*Ornithoptera richmondia*) female

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PLANNING AND ORGANIZATION MEETINGS

A quarterly meeting is scheduled in order to plan club activities and the magazine. See BOIC Programme.

CONTACT ADDRESS AND MEMBERSHIP DETAILS

PO Box 2113, Runcorn, Queensland 4113
Membership fees are $30 for individuals, schools and organizations.

AIMS OF ORGANIZATION

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organize excursions around the theme of invertebrates e.g. butterflies, native bees, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote the conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate friendly habitats in urban areas.

MAGAZINE DEADLINES

If you want to submit an item for publication the following deadlines apply:
March issue – February 1st June issue – May 1st
September issue – August 1st December issue – November 1st

COVER

Richmond Birdwing (*Ornithoptera richmondia*) female – Painting by Andrew Atkins

From the President

Congratulations to club member Ted Edwards who was made a *Member of the Order of Australia* in the Queen's Birthday honours list in June. This honour recognises his long service to entomology and his service to the community especially. For the more than ten years in "retirement" Ted has continued to provide identifications and advice about moths to a great many people and organisations. To quote Ted: "This has made communication about moths possible in Australia (no names, no communication), helped to maintain standards and facilitated publication by a great many people. It would all have been impossible without the generous collaboration and support of a few close colleagues." Many club members would be aware of Ted's long-term role in looking after the moth collection at the Australian National Insect Collection of CSIRO in Canberra.

It may seem repetitious but, once again, many thanks to our contributors whose articles are guaranteed to trigger your interest. We are indebted to them.

With this edition of the Magazine you will receive a membership card. This card has been generously designed and produced by club member Phillip Osche at no cost to the club and I thank him on your behalf.

The Brisbane City Council continues to recognise the work of the club in the field of biodiversity and recently granted us $1000.00 to help with printing costs. I thank them for their ongoing support. Best wishes *Ross*

In This Issue

A list of butterflies (Papilionoidea) and skipper butterflies (Hesperioidea) found within a 10km diameter area centered on the village of Eudlo in the hinterland of the Sunshine Coast with a note on their migratory habits. -

Andrew Atkins, PO Box 42, Eudlo, Queensland 4554

Introduction

Eudlo is a small, semi-rural area about 15km inland from Maroochydore in southeastern Queensland. The countryside is generally undulating and hilly, dissected by Jurassic sandstone ridges and overlain by more recent volcanic rock and soil, the latter originating from the nearby Glasshouse Mountains region. Heavily timbered hillsides of wet scleromorphic woodlands and valleys of rainforest are scattered throughout the region. Most of the rain occurs during summer monsoonal activity and late spring thunderstorms, but the climate can also be influenced by southern ocean activity, especially in winter. During the late 1800's the riverine areas and slopes were plundered for valuable timber (including cedar), but these forests have made good recovery. To the west are the more upland areas of the Blackall Ranges that surround the scenic tourist and market townships of Mapleton, Montville and Maleny. These areas (part extensions of the Great Dividing Range) contain greater elements of species associated with southern climates.

The Eudlo area (not to be confused with Eulo, a small outback town on the south-western Queensland Paroo River) has a good diversity of fauna and flora, with well over 200 species of birds and several threatened species of plants, and the residents are strongly in favor of retaining 'natural' tracts of bushland. Dingoes still scavenge the woods (and wheelie-bins!) and there are also excellent populations of goannas, platypus, wallabies, possums and gliders. However, koalas appear to be dwindling and quolls are probably already extinct.

Butterfly species occurrence

There are more than 150 species of butterfly found in the Sunshine Coast, including good populations of the charismatic Richmond Birdwing, *Ornithoptera richmondia.* in both lowland remnant subtropical rainforest and upland forests of the Blackall and adjoining Conondale Ranges where its hostplant vine *Pararistolochia praevenosa* still occurs.

Several other (herein unlisted) butterfly species are found outside the perimeter of Eudlo but occur commonly within the greater Sunshine Coast area. These include species normally found in particular habitats such as beach dune, melaleuca (paper-bark) wetland, sedgelands, coastal wallum heath, estuarine and coastal woodland and mangrove forest. Additionally, upland temperate rainforest, heath and

woodland contain many species of southern origin. Several other species, which normally fly at tree-top level, are likely to occur in the immediate area (eg. lycaenids in the genera *Acrodipsas*, *Ogyris* and *Hypochrysop*s). These are more likely to be identified on peaked hilltops, which are absent (or covered by tall trees) around Eudlo.

None of the species listed are particularly limited to specific adult seasonal occurrence, most being found throughout the warmer months but are often absent during extended periods of dry weather. Most of the species are more numerous in the wetter months of January, February and March, notable exceptions being: *Heteronympha mirifica* (males present October to December, females March to April), *Hypocysta metirius* (most months except July) and *Delias nigrina* (more common in cooler months). Some butterflies are locally rare although not uncommon elsewhere. These include the lycaenids *Candalides margarita*, *Hypochrysops digglesii, Erysichton palmyra* and *Ogyris zozine*, which rely on the well-scattered local occurrence of their larval food plants, mistletoe species, found in this area. Also the ringlet *Hypocysta irius* (I have one record only from near Palmwoods) may now be extinct in the immediate area, and the skipper *Hesperilla sarnia* (always extremely local) is very rare. Tragically, the beautiful Laced Fritillary (*Argyreus hyperbius*) now appears to be extinct in its former southeastern Queensland stronghold on the Sunshine Coast.

Butterfly migration

Several species migrate through the area, most of them seasonal (SM), generally in late spring or early summer and less so in autumn (usually north or south bound). Others are more erratic or occasional migrants (OM) seen in small numbers, but fairly regularly. Local migrants (LM) travel between habitats, say from western montane or dry vine forests areas to wetter coastal regions, or just from forest to forest. Several of these migrants choose different migratory ‘modes’ according to local seasonal rains or other unknown factors. From year to year the composition of these different-mode migrants can differ greatly in numbers and species observed. Several often fly together, especially in alignment with the arrival of large high pressure systems. At other times, such as the dry spring of 2011, migrants are virtually absent. Many migrants, particularly the pierids (eg Caper White) and the Blue Tiger originate from inland Brigalow Belt and other sub-monsoonal vine-forest breeding areas, and their numbers have gradually decreased as these ‘dry rainforests’ have been clear felled for agriculture!! This is particularly evident in the almost total absence in recent years of the night/day migratory skipper *Badamia exclamationis*. Suitable food plants for these migrants grow naturally in local habitats, and many undoubtedly breed in the Eudlo district or nearby. At least some part of the life history of most of the listed species has been recorded from the Sunshine Coast.

The most notable local migrant on the Sunshine Coast is the (female, particularly) Richmond Birdwing. The front cover of this issue illustrates one such female, observed in mid-March 2005, as it arrived directly from the east, flying steadily above the ocean surf, then flew across the Mooloolaba triathlon and finally vanished over the 'high-rises' towards the southwest hinterland!

The best place to observe migratory flight is from the seashore, paddocks, or hilltops surrounded by low vegetation. In forests, the line, direction and elevations of these flights can be disrupted. However, cleared corridors of vegetation can channel the migrants into spectacular dense rolling columns that ebb and flow between gaps and over montane ridges. It is very hard to establish why and predict when the large migrations appear on the Sunshine Coast. However counter effects of dry seasons followed by wet seasons (and associated strong larval food plant re-growth), together with approaching large, centrally placed, high-pressure weather systems, appear to be important catalysts for large migratory activity. The majority of these almost certainly originate from the (afore-mentioned) inland brigalow shrubland, softwood scrub and vine thicket forests, with a general north to south (spring-early summer) and south to north (late summer-autumn) movement depending on the exact location of the weather systems. The mass removal of these forest types from NSW and Queensland have been accompanied by a dramatic drop in the numbers and density of migratory flights of butterflies seen on the coast and across hinterland areas in recent years.

Eudlo species list

Note: This list follows Braby (2004) and Atkins and Edwards (1996), except that the nomenclature of the Hesperiidae has been modified, made necessary by recent molecular (DNA) systematic studies by Warren et al., 2008. This includes tentative new tribal and subtribal names for the Trapezitinae (Atkins, unpublished). The nomenclature of other butterflies follows that of Braby, 2010 with emphasis on new tribal re-arrangements (underlined). The letters after some species' names indicate; LM = Local Migrant; SM= Seasonal Migrant; OM= Occasional Migrant.

FAMILY HESPERIIDAE
Subfamily EUSCHEMONINAE
Euschemon rafflesia Regent Skipper
Subfamily COELIADINAE
Badamia exclamationis Narrow-winged Awl SM
Hasora discolor Green Awl LM
chromus Chrome Awl SM
khoda Narrow-banded Awl LM

Regent Skipper (*Euschemon rafflesia*) male
Photo Glenn Leiper

Subfamily PYRGINAE

Tribe Tagiadini

Chaetocneme beata Eastern Dusk-flat
denitza Ornate Dusk-flat
Netrocoryne repanda Bronze Flat

Subfamily TRAPEZITINAE

Tribe Trapezitini

Trapezites maheta Northern Silver Ochre
genevieveae Ornate Ochre
praxedes Southern Silver Ochre
symmomus Splendid Ochre
eliena Orange Ochre
iacchus Brown Ochre
petalia Black-ringed Ochre

Tribe Hesperillini

Sub-tribe Toxidina

Signeta tymbophora Dark Shield-skipper
peron Dingy Shield-skipper*
Toxidia parvula Banded Grass-skipper
rietmanni White-brand Grass-skipper

Dingy Shield-skipper (*Signeta peron*) female
Photo Russel Denton

Sub-tribe Hesperillina

Hesperilla ornata Spotted Sedge-skipper
picta Painted Sedge-skipper
sarnia Swift Sedge-skipper

Sub-tribe Mesodinina

Mesodina halyzia Eastern Iris-skipper

Subfamily HESPERIINAE

Tribe Baorini

Pelopidas lyelli Lyell's Swift LM
agna Dingy Swift LM
Parnara amalia Orange Swift LM
bada Grey Swift LM

Dingy Shield-skipper (*Signeta peron*) male
Photo John Moss

Tribe Taractrocerini

Taractrocera anisomorpha Large Yellow Grass-dart
Ocybadistes hypomeloma White-margined Grass-dart
flavovittata Narrow-brand Grass-dart
walkeri Greenish Grass-dart
ardea Orange Grass-dart
Suniana lascivia Dark Grass-dart
sunias Wide-brand Grass-dart
Arrhenes marnas Swamp Darter

Telicota colon Pale-orange Darter
anisodesma Southern Large Darter
ancilla Greenish Darter
Cephrenes augiades Orange Palm-dart
trichopepla Yellow Palm-dart

FAMILY PAPILIONIDAE
Subfamily PAPILIONINAE
Tribe Leptocircini
Protographium leosthenes Four-barred Swordtail
Graphium macleayanus Macleay's Swallowtail LM
sarpedon Blue Triangle
eurypylus Pale Triangle SM
Tribe Papilionini
Papilio aegeus Orchard Swallowtail
anactus Dainty Swallowtail OM
fuscus Fuscous Swallowtail
demoleus Chequered Swallowtail SM
Tribe Troidini
Subtribe Troidina
Cressida cressida Clearwing Swallowtail LM
Ornithoptera richmondia Richmond Birdwing OM

Cressida cressida male
Photo Hongming Kan

FAMILY PIERIDAE
Subfamily COLIADINAE
Catopsilia pyranthe White Migrant SM
pomona Lemon Migrant SM
scylla Orange Migrant OM
gorgophone Yellow Migrant OM
Eurema brigitta No-brand Grass-yellow SM
herla Pink Grass-yellow OM
smilax Small Grass-yellow SM
hecabe Large Grass-yellow SM/OM
Subfamily PIERINAE
Elodina parthia Striated Pearl-white SM
padusa Narrow-winged Pearl-white LM
angulipennis Southern Pearl-white LM
Belenois java Caper White SM/OM
Tribe Pierini
Subtribe Appiadina
Appias paulina Yellow Albatross LM

Eurema hecabe
Photo Ross Kendall

Subtribe Pierina
Pieris rapae Cabbage White
Subtribe Aporiina
Cepora perimale Caper Gull LM
Delias nysa Yellow-spotted Jezebel
aganippe Spotted Jezebel LM/SM
argenthona Scarlet Jezebel OM
nigrina Black Jezebel

FAMILY NYMPHALIDAE
Subfamily DANAINAE
Tribe Danaini
Subtribe Danaina
Tirumala hamata Blue Tiger SM
Danaus petalia Lesser Wanderer LM
affinis Swamp Tiger LM
plexippus Monarch SM/LM
Subtribe Euploena
Euploea tulliolus Purple Crow SM/LM
corinna Common Crow LM
Subfamily HELICONIINAE
Tribe Acraeini
Acrea andromacha Glasswing LM
Tribe Vagrantini
Cupha prosope Bordered Rustic LM
Subfamily LIMENITIDINAE
Tribe Neptini
Phaedyma shepherdi White-banded Plane LM
Subfamily NYMPHALINAE
Tribe Nymphalini
Mynes geoffroyi Jezebel Nymph
Vanessa kershawi Australian Painted Lady SM
itea Yellow Admiral SM/OM
Tribe Junoniini
Junonia orithya Blue Argus LM
villida Meadow Argus SM/OM
hedonia Chocolate Argus OM
Hypolimnas alimena Blue-banded Eggfly OM
bolina Varied Eggfly SM
Tribe Kallimini
Doleschallia bisaltide Leafwing

Tirumala hamata
Photo Ross Kendall

Euploea tulliolus
Photo Hongming Kan

Subfamily CHARAXINAE
Tribe Charaxini
Charaxes sempronius Tailed Emperor
Subfamily SATYRINAE
Tribe Melanitini
Melanitis leda Evening Brown
Tribe Satyrini
Subtribe Coenonymphina
Tisiphone abeona Varied Sword-grass Brown
(subspecies *rawnsleyi*)
Heteronympha mirifica Wonder Brown
Hypocysta irius Orange-streaked Ringlet
metirius Brown Ringlet
pseudirius Grey Ringlet
Subtribe Satyrina
Ypthima arctous Dusky Knight

Swordgrass Brown
(*Tisiphone abeona rawnsleyi*) female
Photo Wesley Jenkinson

FAMILY LYCAENIDAE
Subfamily THECLINAE
Tribe Luciini
Hypochrysops miskini Coral Jewel
digglesii Silky Jewel
delicia Moonlight Jewel
Philiris innotata Purple Moonbeam
Tribe Ogyrini
Ogyris zozine Northern Purple Azure
Tribe Zesiusini
J*almenus evagoras* Imperial Hairstreak LM
ictinus Stencilled Hairstreak LM
Tribe Deudorigini
Deudorix diovis Bright Cornelian LM
Rapala varuna Indigo Flash LM

Orange-streaked Ringlet (*Hypocysta irius*)
Photo John Moss

Subfamily POLYOMMATINAE

Tribe Candalidini
Candalides margarita Trident Pencil-blue
absimilis Common Pencil-blue
consimilis Dark Pencil-blue
hyacinthina Varied Dusky-blue
erinus Small Dusky-blue

Tribe Polyommatini

Nacaduba kurava White-banded Line-blue
berenice Large Purple Line-blue
Nacaduba biocellata Two-spotted Line-blue
Erysichton palmyra Marbled Line-blue
ineatus Hairy Line-blue
Psychonotis caelius Small Green-banded Blue LM
Prosotas dubiosa Purple Line-blue
Catopyrops florinda Speckled Line-blue
Sahulana scintillata Glistening Line-blue
Theclinesthes onycha Cycad Blue
miskini Wattle Blue LM
Leptotes plinius Plumbago Blue LM
Catochrysops panormus Pale Pea-blue OM
Lampides boeticus Long-tailed Pea-blue SM
Everes lacturnus Orange-tipped Pea-blue OM
Famegana alsulus Black-spotted Grass-blue OM
Zizeeria karsandra Spotted Grass-blue OM
Zizina otis Common Grass-blue SM
Zizula hylax Dainty Grass-blue SM
Euchrysops cnejus Spotted Pea-blue LM

Theclinesthes onycha (Cycad Blue)
Photo Hongming Kan

*The skipper species *Toxidia peron* is here placed in the genus *Signeta* as indicated by molecular studies (Warren et al, 2009), and personal morphological studies (unpublished).

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Acknowledgement

I thank John T Moss for his helpful comments on reviewing several drafts of the manuscript

Life history notes on the noctuid moth *Aedia arctipennis*, Hulstaert 1924 Lepidoptera: Noctuidae: Aediinae - *Graham J. McDonald*

During a visit to Burleigh Heads (Queensland) beach in mid-January 2012, I noted several colourful striped moth larvae (Fig.1) on the Goat's Foot Morning Glory Vine (also called Goat's Foot Convolvulus): *Ipomoea pes-caprae* subsp. *brasiliensis*: family Convolvulaceae (Fig. 2). This vine is common on beach frontal dunes often growing with beach spinifex, *Spinifex sericeus*. Together, they form a covering mat of protective leaves and stems which stabilise the beach dunes from erosion, particularly wind erosion.

Fig. 1 Larva

Fig. 2 Goat's Foot Morning Glory (*Ipomoea pes-caprae* subsp. *brasiliensis*)

Subsequently, three larvae and some vine were collected and the larvae reared in a container of sand, leaf litter and live vine sections with leaves attached. On 20th January, the larvae 'disappeared' from view, after attaining a length of 35 mm. Disturbance of the sand revealed three cocoons of ovoid shape composed entirely of sand grains cemented together. The glue appeared to be a secretion produced by the larvae. Two of the cocoons (see Figs 3 & 4) contained healthy pupae and the third a senescent larva. The cocoons were about 25 mm x 10 mm in size.

Fig. 3 Cocoons

Fig. 4 Cocoon and pupa

Two healthy moths emerged about 20 days later on 8 February. Each had a wing span of 38 mm and a body length of 18 mm (see Figs 5 & 6). Positive identification of this moth proved difficult as there are many very similar looking, but entirely different species.

Fig. 5 Adult moth

Fig. 6 Adult moth (hind wings visible)

The Australian National Insect Collection has similar specimens; one reared by Ed Slater from Surfers Paradise in January 1962 on 'Goatsfoot Convolvulus' and one by Ken Sandery on 'Convolulus' at Bucasia Beach, (Mackay, Queensland) in June 2000 (Ted Edwards pers. comm). John T. Moss collected similar larvae on dune Goatsfoot Convolvulus at Byfield (near Rockhampton, Queensland) in 2010, but they failed to thrive and develop. (John Moss pers. comm).

The species was described by Hulstaert in 1924 from an Indonesian Island, Tanimbar and this specimen matches my photos closely. Specimens from the Northern Territory coast and the Queensland coast are also in the Australian National Insect Collection. It is therefore fairly safe to assume that this moth is a strictly coastal species inhabiting beach strand areas. These collection areas correspond to the distribution of the vine, *Ipomoea pes-caprae* subsp. *brasiliensis,* which is almost always found growing in beach strand habitats. This vine is known to occur along the coast from north-western West Australia across the Northern Territory and through Queensland into New South Wales. Overseas, it occurs in Melanesia, the Pacific Islands, Malesia and South-east Asia.

There is a closely related moth species, *Aedia canescens*, described by Hampson in 1926. However, this species occurs from the Pilbara through to central Australia and it is not a beach species. This moth may feed on other arid country *Ipomoea* such as Rock Morning Glory, *Ipomoea costata*; Poison Morning Glory, *I. muelleri* and *I. polpha*. There are forty species of *Ipomoea* recorded from northern and central Australia.

A paper by Tindale, N. B. 1941 "Life History of a Convolvulus feeding moth, *Aedia acronyctoides* (Gueneé, 1954): Lepidoptera Heteroneura, Family Noctuidae"

(Records of the South Australian Museum), may provide useful comparisons with *Aedia arctipennis*, for those wishing to research further.

Photos: Graham J. McDonald

Acknowledgement: E. D. (Ted) Edwards, for historical information and identification of the moth.

References:

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Moore, Philip, (2005). *A Guide to Plants of Inland Australia*, Reed New Holland: Sydney.

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Another moth (Lepidoptera) utilising sand - *Peter Hendry*

Following on from Graham McDonald's article on the life history notes of *Aedia arctipennis*, I found an historical record of another moth which uses sand grains for its cocoons.

In 1922 A.J. Turner described *Crambus ammoploceus,* "A Spinner of Sand". Turner's name has become a synonym of *Conocrambus medioradiellus* (Hampson, 1919), now a member of the family Crambidae subfamily Crambinae. As part of his description Turner made the following notes :

"N.Q., Dunk Island; two specimens received from Mr. E. J. Banfield, who has also sent larval galleries and cocoons with pupae, which unfortunately did not survive. From these and from information received from Mr. Banfield, I gather that the larvae inhabit galleries several inches in length in the sand under Casuarina trees. The gallery is lined with grains in the sand fastened together with silk; the larva emerges from the gallery, seizes the end of a piece of Casuarina stem that lies on the surface and, biting off a convenient length, backs down to the bottom of the gallery, carrying the fragment with it. In captivity the pupae are found in egg-shaped cocoons of sand and silk."

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Life history notes on the Orange-streaked Ringlet, *Hypocysta irius* (Fabricius, 1775) Lepidoptera: Nymphalidae -*Wesley Jenkinson*

The Orange-streaked Ringlet also previously known as the Northern Ringlet is encountered along much of the eastern coastal districts from north-eastern Queensland southward into northern New South Wales. The species is generally common north of Brisbane becoming less common south of Brisbane.

This species appears to be more restricted to wetter areas than the Orange Ringlet (*H. adiante*), Rock Ringlet (*H. euphemia*) and Grey Ringlet (*H. pseudirius*). The preferred habitats are tropical, subtropical rainforest margins, along creeks and moister gullies in dry rainforest, dry vine scrub and eucalypt open-forest.

The adults are localised, flying in dappled sunlight within forested areas usually within a couple of meters from ground level. They have the typical ringlet 'bobby' flight and while basking their wings are periodically opened and closed quickly, revealing the upper-side colours. Once disturbed they can fly quite rapidly and can be difficult to follow through understorey vegetation. The males are quite territorial and do not appear to hilltop as with other species in this genus. Both sexes feed from a variety of small native and introduced flowers.

Whilst in flight, the adults can be very easily confused with the Brown Ringlet (*H. metirius*), particularly older worn specimens. In comparison to *H. metirius* and *H. pseudirius,* the adults have an orange suffusion across the upperside of the forewings. The eyespots on the underside of the hind wings are also consistently larger than in those two species. The sexes are quite similar in appearance. In comparison to the males, females have the upperside forewing central orange patch brighter and often more extensive and the forewing is slightly broader with the termen (outer/lower margin) more rounded (Braby, 2000).The average wingspan for the males is 33mm and 35mm for the females.

Hypocysta irius (Orange-streaked Ringlet)
Images left to right: male, female, male underside, female underside

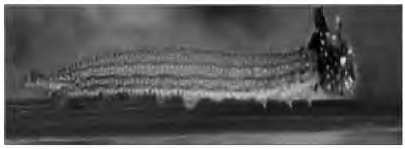
On a recent trip during April 2012 to the Perry River west of Bundaberg, a female was collected and kept in captivity. She laid two eggs and was then released. These eggs were kept for life history studies. Subsequently the larvae were successfully raised on the native grass Green Couch (*Cynodon dactylon*) with both of the adults emerging as large sized females. It appears that the usual native host grasses for this species so far are not recorded.

The eggs were smooth and translucent cream coloured, slightly off spherical, approximately 0.8mm high x 0.8mm wide.

Freshly laid egg of *H. irius*

1st instar larva

2nd instar larva



3rd instar larva

4th instar brown larva

4th instar green larva

The first instars emerged by 8.00am and consumed their eggshells shortly afterwards. The two larvae were observed feeding solitarily during daylight hours and resting on either side of the leaves of the utilised host plant. Typically like other species in the genus, they were very slow moving and fed from the outer edge of the leaf. Both of the larvae raised completed four instars (similar to *H. metirius, H. pseudirius, H. adiante and H. euphemia*). Graham Wood in 1988 also recorded four instars for this species, (Braby 2000). Unfortunately the final instar larval size was not measured but was thought to be approximately 23mm long. The final instars produced two colour forms as pictured above.

Pupa lateral, dorsal and ventral view

The pupae were attached by silk to grass stems, hanging by the cremaster with the head suspended down. They were light grey in colour with a length of 14mm.

The total time from egg to adult was about two months, with egg duration of 5 days, larval duration 36 days and pupal duration of 19 days.

Within the boundary of the new Scenic Rim Regional Shire south of Brisbane I have adult records for the months from September to December, February and May. These records probably indicate there are two generations annually in this region. Although Atkins (this issue) reports this species declining on the Sunshine Coast, John Moss and myself found it was quite common along the Gunalda Range between Gympie and Maryborough.

Photos Wesley Jenkinson

Reference:

Braby, M.F., 2000. Butterflies of Australia – Their Identification, Biology and Distribution. vol 2. CSIRO Publishing.

More About *Arkys* - *Densey Clyne©*

It was a long time ago and my memory ain't what it was! But I have the photographs to prove it.

It was in the 1960's and 70's in my Turramurra (Sydney) garden that I first came across the intriguing little spiders that I then identified as species of *Archemorus.* I was still teaching myself macro photography then but the images have lasted reasonably well; now thanks to Rob Whyte's interesting article in the March 2012 issue of Metamorphosis I can reassign the spiders to the genus *Arkys* and now identify all the species I photographed back then.

It was clear that these were renegade orb weavers, spiders that had given up web-making for a more subtle method of prey capture. For some time that method remained a mystery as my interests ranged widely over the invertebrates that shared that amazing garden with me. I did pick up a few clues, though, and made some guesses.

Over time I observed several different species (or colour forms) of the spider sitting in the open on leaves, sometimes with prey. These victims seemed more often than not to be flies, some recognisable as Asilids or Robber flies. The spider characteristically held the victim by the head end, perhaps only on initial capture.

Clearly this was not a random capture of any old insect that happened to settle on the leaf where the spider lurked. There had to be an attractant of some sort, either natural or artificial. This kind of prey capture is not uncommon in the spider world. A natural attractant is the sweet scent of flowers that lure nectar -feeding insects into the clutches of lurking Thomisid flower spiders. A very different and fascinating Thomisid spider called *Phrynarachne decipiens* attracts flies and other victims with the putrid smell of its own faeces. Things are taken a step further when a spider uses chemical mimicry as a decoy to lure specific victims.

So what is it that *Arkys* offers, sitting out there in full view in daylight? Sex, of course. Easy. Just disseminate the scent of a female insect and her male counterpart makes a bee-line, to end up in a deadly embrace. Perhaps the most sophisticated example of this is the technique of the spider *Ordgarius magnificus*, involving a male moth attractant and a swinging bolas. For *Arkys* it could be much simpler. She just puts out the chemical lure and awaits the results. My conjecture is that she attracts male flies by simulating the sex pheromone of their females.

The structural patterns of some of those spiders that I first knew as *Archemorus* are almost sculptural, with an impression of intaglio or counter relief. The conservative colours of most of them contrast with the bright red or orange of *Arkys lancearius* and some others and at first glance they seem camouflaged as bits of debris. It takes a magnifying glass to reveal the beauty and complexity of the various forms. But in

such exposed situations the camouflage must work for them against birds and other predators.






The images show some distinctive forms of *Arkys curtulus,* two individuals with prey and one with an egg-sac.

Sadly I have found no *Arkys* species in my present garden so it is up to other field researchers to complete the story of these intriguing tricksters. But fifty years ago they were part of what got me hooked for life on the amazing whys and wherefores of spider life.

Photos Densey Clyne

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Field notes on butterflies in the Society Islands, French Polynesia: Part 2: Tahiti Nui (Section 3 – Discussion & conclusion) - *Kelvyn L Dunn*

The first part in this series on my trip to the Society Islands, in February and March 2007, listed observation on Mo'orea (section 1) and Bora Bora (section 2), and the second part dealt with those made on Tahiti, which is geologically the younger of the three islands, but a much larger land mass. This is the final section of the Tahiti component. It summarises the findings from the transect study (section 2), concludes

on these, and in doing so proposes questions concerning the potential distribution, the life history and possible host association of the key species focussed upon, namely *Nacaduba tahitiensis*, as directives for further investigation. This paper refers to Figures 23-24 & 34-35; these are not included with this third section as they appeared in the previous sections of Part 2 (see Issues 64 & 65).

Discussion of the transect findings

Butterflies were generally uncommon in the various forest habitats along the roadside up to the Mt Marau towers. Only four species (all identified with certainty) were recorded over two consecutive observation periods (tallying 14 hours & 15 minutes), undertaken during variable weather. Of the adults sighted along the walked transect (a horizontal distance of almost 11 kilometres and vertical distance of about 1000m) most were in flight. Field identification of each individual butterfly was a slow process without use of an extendable-handled net, the normal means used for survey work. Moreover, some encounters were 'lower-grade' observations (as discussed in the inventory – see section 2), because for those particular records the probable identifications could not be confirmed without close inspections of the adults sighted.

Blossoming plants were sparse in the cloud forest. I had hoped that the extensive growth of *Lantana camara* (Verbenaceae) at Tower 2 might attract (in addition to those seen) various other butterfly species historically known from Tahiti. In particular, I had anticipated seeing the familiar and widespread Varied Eggfly, a nymphalid that favours this flowering plant, but which was conspicuous by its absence: *Hypolimnas bolina* (as subspecies *otaheitae* in Niue, Cook Islands and French Polynesia – Tennent 2006) was occasional in coastal areas about Pape'ete (Dunn 2012a), but none was seen in the montane forests. The *Lantana* may have been nectar-poor or perhaps the flowers were aged. Only a single adult of *Nacaduba tahitiensis* attempted to feed (during several hours of watching near that plant) and when it did so, the flower upon which it alighted instantly fell off (dehisced) its peduncle. However, another species, *Lampides boeticus*, had established territories that seemed linked to this nectar source; two males repeatedly patrolled a section of the plant when the weather was suitable.

Species encountered along the transect

Lampides boeticus

This migratory butterfly may be an irruptive visitor that establishes temporary populations in the Society archipelago (Dunn 2012b). It probably breeds opportunistically wherever larval hosts are seasonally available, and likely occurs over much of Tahiti Island, but time was not available to search more extensively in other parts of the Island's interior to confirm this. Along the transect, *L. boeticus* ranged in elevation from about 460m up to 1374m at Tower 2. It almost certainly occurs down to sea level on Tahiti, as it was present in coastal areas on Bora Bora (Dunn *op. cit.*). Variably aged females were seen inspecting a known host plant

(*Crotalaria* sp.) adjacent to forest margins at about 960m and at about 1100m elevation. A female, found in coitus at the second tower (Fig. 41), had likely ascended the escarpment to seek a mate. Given her fresh condition, she had almost certainly bred locally.

Euploea lewinii
This species appeared spatially patchy and uncommon along the roadside. It seemed restricted to denser vegetation types on the mid-slopes (from about 400m up to nearly 1100m elevation). Adults actively patrolled the forest margins but on occasion would settle on low foliage to roost during overcast weather; they seemed wary and the density of the vegetation prevented a close approach. *E. lewinii* (represented locally by ssp. *walkeri* in the Society and Austral Islands) is widespread in the South Pacific (Tennent 2006) and easily recognised.

Phalanta gabertii
This fast flying species is endemic to the Society group. In addition to Tahiti, where near Tower 2 it was moderately common, it occurs on the islands of Bora Bora, Taha'a, Huahine and Mo'orea (Tennent 2006). Along the transect it ranged in elevation from 900m up to 1374m. Fresh males vigorously patrolled the spine ridge but only a single adult (seemingly a male) settled during sunshine (and it did so once only) to bask with wings opened. Its quick departure meant that the chance for a photograph was missed.

Nacaduba tahitiensis
Strongly associated with montane cloud forests, this endemic species ranged in elevation from about 900m up to 1374m. Although locally common at the higher altitudes (above 1200m), towards its lower altitudinal limit adults were usually solitary and uncommonly seen. Mate location in this species involved stationary surveillance from perch sites on selected foliage of *Weinmannia parviflora* and lengthy aerial patrols of nearby airspace. Perch sites presumably cued to sites of oviposition and emergence (where receptive females may be present) rather than nectar sources, as the selected trees were not flowering. In particular, adults congregated about trees of *W. parviflora* bearing new foliage and reddish racemose buds. These trees range in height from 7-10m (Meyer 2010) and the male butterflies perched on the upper surface of leaves, favouring sites 4-5 metres above ground (about mid-height up the trees). During sunny periods, they would fly out to challenge passing males of the same species that came within the defended airspace. In the stunted cloud forest near the ridge, where the canopy is variably only 2-3m high (Meyer 2010), they patrolled closer to the ground, and during cool weather would quickly settle to roost (Fig. 42), awaiting sunshine to resume flight activity. One adult fed at *Metrosideros collina* and another seemingly attempted to feed at *Lantana camara* (see earlier). Those adults visiting flowers appeared as singletons near the plants involved, and their flight territories did not include the nectar sources

where the events took place. Near Tower 2, in the shrub-land ecotone (not far from cloud forest), adults patrolled the escarpment (thereat utilising a landform for mate location). There they flew very low down (about 1m above ground) and perched on ground ferns bordering the spine-ridge trail.

The unique habitat of *N. tahitiensis*

Tropical montane cloud forest (typically characterised by high precipitation, constant humidity, cool conditions and a diurnal cloud cap) is the most floristically diverse of all plant communities in French Polynesia (Meyer 2010). It differs from Polynesian rainforests by the absence of an Asian floristic component. On Tahiti Island, cloud forest occurs from about 900m to about 1400m elevation (Meyer 2010) and coincides with the altitudinal range of the butterfly (as determined during this survey). Indeed, *N. tahitiensis* seemed restricted to this habitat type, with high adult abundance in the subtype co-dominated by *Alstonia costata* and *Weinmannia parviflora.* The genus *Weinmannia* belongs to an ancient Gondwanan plant family, the Cunoniaceae, but this family is not recorded as a larval food plant lineage for *Nacaduba* elsewhere in its broad range that I know of. Like the butterfly, the tree *W. parviflora* is an endemic species in Tahiti, and it grows only in cloud forests. The butterfly also occurred in the lower cloud forest subtype, which is dominated by tree fern (one or more *Cyathea* species) instead. In that particular habitat, adults were more often solitary and comparatively uncommon, compared with the former subtype.

The *Weinmannia* trees seemed more abundant above about 1100m; their dominance in the cloud forest was noticeable as the very fresh foliage and racemes of the many newly budding trees gave the forest a coppery-reddish hue (Figs 23 & 34). Some larger and older trees (presumably of the same *Weinmannia* sp.) bore white pedicellate flowers on long racemes (Figs 43 & 44) and, as they were without buds, their racemes were duller by comparison. There was no obvious epidermal damage on the young serrate leaves (Figs. 35 & 46) of those trees with budding racemes, about which adults flocked. Hence, I think the larvae most likely would feed on the buds, although leaves may be utilised by older larvae, or at times when buds may be in short supply as might happen during peaks of juvenile foraging. Indeed, evidence of old epidermal damage (Fig. 45), which may have been a result of feeding by mature larvae of this or another species of lycaenid butterfly, was found on the undersides of some crenate leaves on one of the larger trees (bearing flowers). However, adult butterflies were not active about the trees in flower. My initial impression was that the leaf damage loosely resembled the excavations created by older larvae of *Hypochrysops digglesii* (Lycaenidae) on mistletoe in Queensland, Australia, but on the balance of probabilities, a moth (rather than a butterfly) larva might have been responsible for it.

Fig. 41. Fresh *L. boeticus* female mating with aged male at tower 2 near *Lantana* during overcast weather (12 Mar 2007, 1305h TAHT).

Fig. 42. *N. tahitiensis* roosting during cool weather on 11 Mar 2007.

Fig. 43. Developing flowers on racemes growing amidst middle-aged crenate foliage, with new buds and new foliage just below.

Fig. 44. Mature flowers and older undulate foliage (adults were not flying around these trees).

Fig. 45. Epidermal damage on aged leaves of *W. parviflora,* which may be feeding scars created by a Lycaenid larva.

Fig. 46. Crimson racemes with new serrate foliage; adults were regularly seen perched on trees at this growth stage.

The butterfly's anticipated flight period
Based on experience with allied species in eastern Australia, it seems likely to me that the adult stage would be present more or less continuously during the hotter months in Tahiti – namely from November to April. Those seen at close range varied from very good to fresh condition (none was worn) and so it seemed that a synchronised emergence had recently occurred. However, the adult freshness may have been an artefact of limited sampling to assess wing condition (only 12 were seen close up over the two days), and a larger sample may have revealed a range of wing wear and adult ages.

Adult variation and taxonomy
An initial count of those adults that could be ably inspected at very close range (to enable certain identification, sexing, and wing condition) done on Day 1 at Tower 2, provided a male to female ratio of 9:1 (n=10). All ten fully agreed with the description by Hara and Hirowatari (1989); each showed the suite of characteristics that distinguish it from the sibling, *N. catochloris* (generically placed under *Hypojamides* in that report). A suitable photo of a male, resting on *Lantana* during a misty cool-snap (Fig. 47), will serve as a comparative example to outline the obvious characters that define the species (*N. tahitiensis*). In agreement: (1) all were without metallic green on the apex of the forewing underside; (2) All seemingly had rather rounded forewings (as best as I could judge this in the photographs of those adults obtained) – Figure 48 provides a silhouetted example that highlights its wing shape; (3) All were without any green iridescence in the marginal area, beyond the outer submarginal lunulae on the hind-wing beneath (see examples shown in Figs 24, 42 & 47). Based on this sample inspected closely, it seemed likely then that the many *Nacaduba* adults active along the ridge and plateau, and those seen lower down to 900m, all belonged to *N. tahitiensis* (rather than another).

The two endemic species, *N. tahitiensis* and *N. catochloris*, seem very similar based on the descriptions available (albeit I have not seen any illustration of *N. catochloris*). This and their remote isolation from other congeners suggest that they are likely siblings of an ancestral founder population that established (presumably less than one million years ago), soon after the island arose and amenable habitat became available. Those factors that promoted the extensively green undersides (a rare colour in lycaenids) probably operated on the ancestral species prior to speciation or on each lineage during its separate development. *N. catochloris*, is known only from a single female taken in March 1925 at 2500ft (762m) in the nearby Fautaua Valley. This site is not far north, by beeline, of the Mt Marau towers, but the elevation is notably lower. I (cautiously) speculate that *N. catochloris* (assuming this taxon is genuinely different – given the type is lost) is restricted to a lower elevation (below 900m). It probably breeds in rainforest beyond the lower altitudinal limit (900m on Tahiti) of the *Weinmannia*-cloud forest and may have diverged on a separate host plant.

Stratification could avoid competition for resources, otherwise over eons of time one species may be at risk of displacement by the other.

The 12 adults of *N. tahitiensis* inspected closely on the spine ridge trail over two days of observations (10 of which were tallied for a sex ratio on Day 1 – see above), showed little variation. One male seen up close on Day 2 at Tower 2 was remarkable though. The overlying iridescent green of the hind-wing under-side in that individual had a copper tinge that refractively ranged to a different shade of green when its wings were viewed obliquely. This piqued my curiosity – the budding *Weinmannia* trees that these butterflies gathered around have a similar hue so this may be part of the species' broader or evolving variation; a coppery tint may aid camouflage – but at lower altitudes, the tree-fern cloud forests are prominently verdant. In that same adult too, the post-median band on the forewing beneath extended farther, albeit proximally offset, from veins CuA1 through to 1A+2A whereas this section was absent in all the other males inspected. Furthermore, the post-median band on the hind-wing under-side, where it extends from veins Sc+R1 through to M1, was broader and slightly darker. It still matched with this species (and not *N. catochloris*) based on the taxonomic characteristics listed by Hara and Hirowatari (1989).

It is useful too, to compare this endemic butterfly with the newly described endemic species from Niue (Lachlan 2012) as there was no commentary on this in the text of that taxonomic piece, and neither was there a key provided to allied species in the South Pacific. The underwing surfaces of those two species are in fact very different. *Nacaduba niueensis* is comparatively well marked beneath and has "iridescent blue-green scales" (rather than green or rarely slightly coppery-toned), which are limited to the basal areas (rather than expansive). Importantly too, along with other clear differences, in *N. niueensis* "the two largest triangular spots between veins CuA2 and M3 have their basal halves covered with bright pale blue iridescent scales…" (Lachlan 2012: 50). This characteristic is absent in *N. tahitiensis*, but extension of iridescent green scales in this region is apparently a feature of *N. catochloris*. If *N. niueensis*, which is (at least on present evidence) a low altitude butterfly (Lachlan 2012), occurs on other islands beyond Niue – considering even the very remote possibility of an allied population as far afield as French Polynesia – it is unlikely to be associated with montane cloud forests, providing further evidence of the ecological distinctiveness of *N. tahitiensis*.

Potential distribution of the butterfly

The isolated distribution of this Tahitian butterfly seems astonishing but this may be due to a lack of exploration. Although believed to be restricted to the Mt Marau area, *N. tahitiensis* is likely to be quite widespread in other upland regions where *Weinmannia*-dominated cloud forest exists in suitable places. Meyer (2010: 125) listed the most important sites for this habitat in Tahiti Nui. These include "near Mts. Marau (1493m), Iviroa (1638m), Ivirairai (1696m), Aorai (2066m), and Pito Hiti

(2110m) on the leeward side, and on Mts. Mauru (1361 m), Urufau (1493m), Aramaoro (1530 m), Teamaa (1532 m), and Tetufera (1799 m) on the windward side". Additional sites exist near Mts. Teatara (1197m), Mairenui (1306 m) and Ronui (1332 m) on the peninsula of Tahiti Iti (Meyer 2010: 124-125).

Fig. 47. *N. tahitiensis* at *Lantana camara* flower at tower 2, settled during overcast weather.

Fig. 48. Silhouetted male of *N. tahitiensis* perched in canopy on middle-aged crenate leaves of *Weinmannia* between tower 1 and tower 2 (11 Mar 2007 at c. 1350h).

Fig. 49. A very worn male, which appears to be *N. tahitiensis*, perched on foliage of budding *W. parviflora* along Mt Aorai track, 8 May 2007, Photo J. Nielsen.

Fig. 50. Two feeding adults of *N. tahitiensis* (one relatively fresh and other in moderate condition) on *M. collina* on Mt Aorai track, 8 May 2007. Photo J. Nielsen. Photographers comment from web page dated 23 Oct 2010: "*I was taking the pic of the pua when the butterflies landed there. I have no clue about the butterflies. This was on the hike to Mt Aorai on Tahiti*" J. Nielsen.

Attribution: Figures 49 & 50. Copyright J. Nielsen 2007: used with permission. http://www.flickr.com/photos/jupiterorca/4602826065/

Other images Kelvyn Dunn

Whilst researching the distribution and taxonomy of *W. parviflora* on the Internet (with the help of botanist, who was intrigued on hearing of this apparent endemic butterfly-endemic plant relationship), evidence of a new population was exposed.

A small lycaenid butterfly was inadvertently included in a photograph of foliage of a *W. parviflora* tree by a Hawaiian trekker on another peak on Tahiti, but one that rises considerably higher than Mt Marau, reaching to 2066m. The worn adult (Fig. 49), which matches with this species (rather than *N. catochloris*), was photographed on 8 May 2007 (at the onset of the dry season and shortly after my own visit). This association with *Weinmannia* again seems remarkable and is circumstantially supportive of an ecological link to this plant.

The photographer, a certain Jupiter Nielsen, recalled that the site was somewhere on "the lower stages of the track to Mt Aorai". This would place it about 1-3km by beeline from Mt Marau towers – not far away – but much of that trail is below 900m at that point, and below the limit of cloud forest. Nielsen provided a link to another photo he took of two of this same species of butterfly feeding together on a flower spike of *Metrosideros collina* in the same general area (Fig. 50). The intended subject of the photo was the flower; the butterflies were included by chance when they landed to feed as he took the photo. *M. collina* is a common species in cloud forest (Meyer 2010) and, given this second report of its usage, it is likely to be an important native nectar source of the butterfly. Moreover, the chance of encountering two adults of the same species feeding on a single inflorescence-spike is rather low in the field, but such an event can occur when adults are locally abundant (see Dunn 2006). Nielsen's evidence suggests the species flies commonly in early May as well (extending the flight period from March), and it probably flies up to two or more weeks later (into late May) as one of his adults was fresh at that time.

Reflections and future directives

These observations and speculations on the plant-butterfly association (hopefully insightful rather than mistaken) may serve as an intuitive guide to those who seek to discover its life history. I trust that this piece will motivate enthusiasts to venture to other sites on Tahiti and its neighbouring high volcanic islands, such as Mo'orea, where tropical montane cloud forest occurs (Meyer 2010) and where this butterfly might await discovery. In addition, some tropical rainforest (which reiterating, is not ecologically true cloud forest due to Asian components) occurs on Bora Bora, at about 600-660m (Meyer 2010). If that habitat is not too small, and if the altitude is agreeable (being less than 900m), the enigmatic sibling species *N. catochloris* may exist there too (see Part 1 for discussion of that island).

More intriguing than this, though, is the presence of a small area of montane cloud forest between 550 and 650m elevation, on Mt Perau on Rapa (Meyer 2010) in the remote Austral islands. Again, this habitat includes the same native nectar source, *Metrosideros collina,* but is dominated by a replacement endemic, *Weinmannia rapensis* (Meyer 2010). A similar situation occurs on Ra'iatea too, where that same nectar source coexists with that island's own endemic, *W. ovalifolia* – indeed, there are ten other islands in French Polynesia that contain cloud forests and many are still

virtually pristine (Meyer 2010). If various islands in remote Oceania have their own endemic species of *Weinmannia*, by corollary then, through long isolation and coevolution, one or more may have its own unique (and overlooked) butterfly species. Specificity to a single plant species within a generic group, though, is not the norm among butterflies but it is intriguing, and I think it makes French Polynesia worth a return visit or two!

Summary

This study on the Mt Marau ridge revealed the following new information concerning *Nacaduba tahitiensis*:

- That it flies in the wet season (in addition to the dry)
- That it inhabits an altitudinal range from about 900m to at least 1375m; and is common above about 1200m (beyond the 8km point) and is sparse at, and below, about 1000m (at the 5.5km viewpoint) down to the limit of cloud forest, at about 900m (about the 4.5km point).
- That it utilises two different families of flowering plants as nectar-sources, one species, *Lantana camara* (Verbenaceae), is an invasive weed in French Polynesia (and elsewhere in the South Pacific) and the other species, *Metrosideros collina* (Myrtaceae) is a native of the montane cloud forest flora.
- That its larvae are likely associated with the racemose buds of the forest tree *Weinmannia parviflora* (Cunoniaceae). The aggregations about this tree presumably equated to the said, 'flocking behaviour' that was first noted by those who discovered the butterfly back in 1988 (Hara & Hirowatari 1989). And finally,
- That, given *W. parviflora* is restricted to French Polynesia (Meyer 2010), then this suggests an interesting butterfly-host linked evolutionary relationship (if the supposition is correct), and assuming too that the taxonomy of this plant group in the Pacific is reasonably stabilised and not congested with synonyms, which may otherwise undermine the tree's endemic status.

Acknowledgements

I wish to thank Dr Russell Best (Victoria University) for his identification of *Metrosideros collina* and for his helpful comments on the manuscript; this included correction and clarification on some botanical terms used. He also found one of the photos on the Internet (presented herein as Fig. 49) whilst seeking images of *Weinmannia* species to assist with the tree species' probable identification, which was based on my photographs of foliage, racemes and flowers (not preserved specimens). He thoughtfully supplied an e-mail contact for the photographer just in case the butterfly depicted was the species this paper dealt with. I also thank Jupiter Nielsen (of Hawaii) who subsequently provided field details on the butterflies he had

photographed in Tahiti and for his permission to reproduce the two images (see Figs 49 & 50).

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"Plant the plants and they will come!" – *Ross Kendall*

We frequently use this statement when someone asks how to attract butterflies to their garden. The "plants" we refer to are butterfly host plants to feed caterpillars and nectar plants to feed adult butterflies.

Of course, it is not just butterfly caterpillars that eat the plants as slugs and snails, aphids and scale insects, grasshoppers and moth caterpillars avail themselves of the opportunity of tasty sustenance. After butterflies do lay their eggs, we soon learn that ants, spiders, bugs and even sibling caterpillars may enjoy a healthy snack. Once the eggs hatch into caterpillars, those same ants, spiders, bugs and siblings may continue to feast but they are joined by birds, frogs, lizards and by both paper and mason wasps. Parasitic fly or wasp larvae may take up "temporary residence" as they consume them from inside. Fungi, bacteria, viruses and protozoa take their toll. Pupae face a similar array of predators, parasites and pathogens – but some do make it to adulthood.

About seven years ago, club member, Bill Graham took up residence in a small clearing in an 80-hectare patch of rainforest on the Atherton Tableland in North Queensland. He is a knowledgeable "butterfly man" who progressively planted the

"right" plants and was rewarded when the butterflies "came". Cairns Birdwings, Ulysses butterflies, Cruisers, Red Lacewings, Lurchers, Blue Banded Eggflies and many other colourful species were soon flying and breeding in his garden.

The local pademelons (probably *Thylogale stigmatica*) had welcomed the addition of a variety of new plants in the neighbourhood so Bill erected a fence to protect his special plants. This worked well until the arrival of "His Nibs" who has no difficulty climbing tall trees and thus found Bill's fence a minor obstacle. His Nibs, whose portrait appears herewith, first took a liking to the nectar plant Pentas (*Pentas lanceolata*) and reduced all plants to stumps. He has since graduated to Adenias (*Adenia heterophylla*), host for Cruisers and Red Lacewings and to Tagala vines (*Aristolochia acuminata*) host for the Cairns Birdwing. Quite a number of these vines were well established and had grown to the rainforest treetops. His Nibs has reduced them to twisted rubble. During his arboreal activities, the Ulysses host *Melicope elleryana* has become a further casualty with its rather brittle branches also reduced to stumps.

His Nibs is in fact a Lumholtz Tree Kangaroo (*Dendrolagus lumholtzi*). If you have faced the same problem, we would love to hear from you!!
Photo: Bill Graham

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Bush Blitz, Fish River Station
"There are more things…" – *Robert Whyte*

Biodiversity is nature's mechanism for survival of all living things. In every niche from icy tundras to searing deserts, life adapts to local conditions, not with just one or two dominant forms, but with limitless variations of form, size, chemistry and personality. Nature, like art, is constantly creative. Not prepared to wait for change in conditions to change its plants, animals and fungi, she constantly invents new and different forms, just in case. It's a bell curve of diversity, hedging bets against change. Outliers on the bell curve hit the jackpot when things change quickly and bring selection pressure. Species better equipped to take advantage of new conditions go gangbusters, having their 15 millions years of fame.

This has been going on for a very long time. In northern Australia, where Bush Blitz is criss-crossing the enormous, flat, red landscape of inland Northern Territory, speckled with stunted monsoon scrub and patterned by the trails left by receding waters, the myriad of life forms are a treasure trove of possibilities and nature's 'Reserve Bank' held in trust for the nation.

"Don't flatter me, I know I'm flat."
View towards the Douglas Daly Research Farm from the air.

The first and lasting impression you get of the country across the top end, south of the Daly River, is how flat it is. Vast tracts of scrub go underwater during the wet and at the beginning of the dry the grassy surfaces are thatched and etched with the evidence of overland flow.

But appearances are deceptive. The nature conservancy of Fish River Station is so huge, the terrain hides small hills, steep gorges, waterfalls and creeks in its vastness. Over 178,000 hectares is a big back yard.

Steve Richards and Dane Trembath, searching for herps, found things a little less flat when they were dropped at the entrance to a gorge by helicopter. It took them three hours to travel just 200 meters through thick vine scrub, over massive boulders and up tortuous fissures, searching for a single calling frog.

I was attending Fish River both as a scientist in arachnology and as the official 'macrophotographer' for the expedition. Other scientists would bring me specimens after their days in the field, transported there and back by helicopter. Around 30 transects of about a hectare each contained up to six ecosystems which the scientists rotated through in teams, sampling for new species.

Since returning to Queensland Museum my colleagues Dr Robert Raven, Dr Barbara Baehr and I have been sorting through the spider specimens. Within a few days of receiving them, Barbara's taxonomic expertise allowed a rapid determination of 10

new species of goblin spiders (Oonopidae). Of these we have now named *Cavisternum attenboroughi* sp. nov., *Opopaea ephemera* sp. nov., *O. fishriver* sp. nov. and *O. johardingae* sp. nov. (Baehr, Raven & Whyte, 2012 submitted).

I was able to indulge my fascination with jumping spiders, abundant on the Douglas Daly Conservation Reserve adjacent to the Douglas Daly Research Station where we were staying. Most entertaining were the *Cosmophasis* spp. captured in stills shown above and movies on YouTube http://youtu.be/o6SBFPmlYKc

The male *Cosmophasis micans* (L. Koch, 1880)
Banded Metallic-green Jumping Spider

Female *Cosmophasis micans* (L. Koch, 1880)
Banded Metallic-green Jumping Spider

I was able to solve a long standing jumping spider mystery with the help of Wayne Maddison, our best jumping spider expert, working now in Canada. Wayne matched up a male with a female I had known as *Cytaea xanthopus,* now *Cytaea plumbeiventris* (Keyserling, 1881) Slate-bellied Cytaea. This common jumping spider features in many books, but was not identified. Now we know, and the pictures are below.

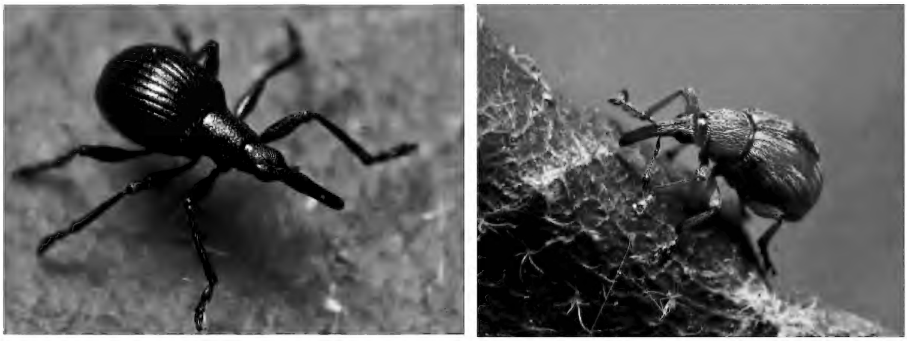
Cytaea plumbeiventris (Keyserling, 1881) Slate-bellied Cytaea, male

Other invertebrate scientists included Celia Symonds, true bugs; Nicole Gunter, beetles; Vince Kessner, snails; and Michael Braby, butterflies.

Celia Symonds, could not resist bringing back a pair of very strange katydids, even though it is not her specialty, the pink female with a long curved ovipositor, the male bright green, pictured below. For Celia, her target bugs were generally abundant in the unburnt grasses, and on flowering plants, along with butterflies, spiders, beetles and moths.

Female (left) and male katydid *Armadillagraecia mataranka* Rentz, Su & Ueshima
found by Celia Symonds on Fish River Station, Northern Territory

I will hold over for a future issue more of the bugs and snails, but for now I will include some of Nicole Gunter's target group, the Coleoptera. Nicole works at the National Insect Collection in Canberra.



The two Curculionid *Apion* spp. weevils in Brentidae: Apioninae, are very attractive. If you decide which one you like the most, the other one must be 'the lesser of two weevils'.

This tiny beetle in the genus *Corylophidae* was only .5mm, yes half a millimetre.

I call this big boofy beetle Uncle Martinez because he has Uncle Martin (the Martian) like antennae with castanets. It is Geotrupidae: Bolboceratinae: *Blackburnium* sp. The elbow guards are rather impressive.

And a popular favourite to end this batch with. (left) Coleoptera: Carabidae: Panagaeini: *Craspedophorus insignis* (Schaum)

The photo below shows some mammals attending the Bush Blitz. I was behind the camera. Photos Robert Whyte

IDs were by David Rentz, Nicole Gunter and Tom Weir except weevils which were IDed by Rolf Oberprieler

Friday night group photo. Standing at the back from left to right Mim Jambrecina, Ben Wirf, Ian Cowie, Nicole Gunter, Vince Kessner, Jo Harding , Dane Trembath, Celia Symonds, Gavin Dally, Christine Cargill, Steve Richards, Dave Wilson and Michael Hammer At the front: Alistair and Darren, Michael Braby, Kate Gillespie, Jeff Long, Donna Lewis and Robert Raven.

Report on an afternoon identifying the Arctiinae – *Peter Hendry*

On the 26th of May 2012 a small group of naturalists and moth enthusiasts gathered at the "Lepidoptera Studio" of Peter Hendry's at Sheldon in southeastern Queensland's Redland Shire. The main intention was to identify as many species of moths of family Erebidae, subfamily Arctiinae (formally Arctidae), as our collective knowledge could attain. While many specimens and photographs were identified, including some members of other families, a few remained in the "too hard basket". In particular the "difficult" genus *Amata* was left for another day!

Of interest, John Moss had a specimen of the iridescent north Queensland *Euchromia creusa* (Fig. 1) and a specimen of *Termessa discrepans* (Fig, 2). John's *T. discrepans* closely resembles the "pale form" of *T. conographa* (Fig. 3) more so than that illustrated in my article on the Australian arctiid moths in *Metamorphosis Australia* issue 65 of June 2012.

The afternoon was followed by a barbecue dinner, enjoyed by all, and highlighted with an insect mercury vapour ultra-violet light trap. The highlight of the light trap was finding a specimen of the arctiid moth *Cyana* (*Chionaema) meyricki* (Fig. 4). While known to me, I had never seen this moth before. John Moss and Geoff Monteith covered aspects of its life history in *Metamorphosis Australia* issues 52 and 53.

I would like to thank all who attended, as well as my wife Bev and sister-in-law Val, for helping with the catering. Hoping to see you on our next afternoon/evening identifying more moths, focusing on those in the Crambidae (formally part of Pyralidae).

Photos Peter Hendry

Fig. 1 *Euchromia creusa*

Fig. 2 *Termessa discrepans*

Fig. 3 *Termessa conographa* pale form

Fig. 4 *Cyana meyricki*

BOOK REVIEW

Bugs of the Ocean by Kerry Swanson – *Reviewed by Dennis Tafe*

As a zooplankton specialist I have seen many publications on phytoplankton and zooplankton but this one is unique. It includes 3D glasses so the reader can see exactly how the organism appears in three dimensions.

The author, Kerry Swanson, aims to give the reader an increased awareness of the beauty of microscopic marine life and I believe that he achieves this aim. The intricate shape and structure of coccolithophores and diatoms appear to come out of the page as 3D objects. Some of the spiny species of foraminifera look particularly impressive in 3D.

The book is soft bound and does not try to encompass all phyla of microscopic marine organisms. It is therefore a relatively small publication with a relatively small price compared to the voluminous scientific publications on phytoplankton and zooplankton.

The title "Bugs of the Ocean" is a very good title for such a book. It is not strictly scientific, as the author points out, because the word "bug" does not refer to insects with chewing or sucking mouthparts. It is used here to refer to microscopic living things in the ocean.

All publications have room for improvement and there are two aspects I would like to see addressed in a future edition. Firstly Chapter 1 entitled "Why bugs of the ocean?" only uses two-thirds of each page for typed information. That is good because full pages of printed material with more than 500 words per page can be tiring to read, however, the topics discussed lend themselves to the addition of photographs or illustrations. For example page 1 discusses extinctions like the dinosaurs 65 million years ago and possible reasons. A picture of an asteroid colliding with the Earth is just one possible picture to excite the imagination. On page 2 the author discusses more recent extinctions and the possible role of human activity. Pictures and photographs could be used to emphasise the point and to break up the written print. The author goes on to say that photographs of threatened species invoke emotional reactions from people. I would like to see photographs of some of the threatened species, both large and microscopic. The topics discussed over the next few pages include "global warming" and the importance of our oceans and the microscopic life within. These pages of type would benefit from relevant illustrations and photographs from other sources, which can be acknowledged if necessary.
The second point that would enhance a future edition is the inclusion of more specific names to some of the Crustacea, since it is such a large subphylum. The author does say that the aim is not a scientific publication and therefore we do not want too much

taxonomic detail. However, Crustacea includes so many microscopic marine animals it would be easy to give the "Class" name, as he has with the Class he studies, the Ostracoda. For example the picture on page 55 is from the Order Cumacea, the one on page 58 is from the Order Cyclopoida. He does mention that the latter one is a copepod (Class).

The above points are relatively minor. Overall the book is a useful addition to the library of anyone interested in the world of microscopic marine organisms.

Bugs of the Ocean is available from http://www.publish.csiro.au/pid/6712.htm for $39.95

LETTERS

Just a quick comment on Aristolochia tagala as a food plant for Birdwing butterflies: "A promotional program by Townsville City Council led by Alderman Val Valentine in the 1980s has established many garden plants of Aristolochia tagala, the native pipevine larval food plant of this species. As a result, this largest of all Australian butterflies is now well established in Townsville urban areas," as Peter Valentine notes on his list of butterflies and their food plants at http://www.tesag.jcu.edu.au/staff/psv/butterflyTSV.html#Papilionidae (a list, incidentally, which may be of interest to many of your members).
The results are still quite evident, and there is still a lot of community support for growing the vine. The local Landcare group uses it in revegetation projects, schools plant it in their environmental projects and many (perhaps most) keen gardeners know about the connection.
I have had the vines in my own garden for at least ten years and can vouch for all the good things said about them by your anonymous contributor. In our dry tropical climate they are easy to grow and do attract Cairns Birdwing and Clearwing Swallowtail.
Birdwing caterpillars are voracious and and have been known to eat young vines down to the root but apart from that we have had no problems at all. They don't smother their supporting plants like some other creepers and, while they produce abundant seed, they don't self-sow to any problematic extent.
Regards,

Malcolm Tattersall
Townsville
Enviroblog: http://malcolmtattersall.com.au/wp/

OMISSIONS

My apologies to Wesley Jenkinson for omitting to include the 5th instar larva in his article - Life history notes on the Lyell's Swift, *Pelopidas lyelli lyelli* (Rothschild, 1915) Lepidoptera: Hesperiidae – which appeared in Issue #65 June, 2012. Ed.

The 5 instars are pictured here

1st instar larva

1st instar larva inside shelter, showing chewing from the leaf edge

3rd instar larva

4th instar larva

5th instar larva

YOU ASKED

This is the follow-up to the previous reply in "You Asked":
Matthew Purcell, an entomologist with CSIRO, who has worked with sawflies as potential biocontrol agents, has kindly cast his eye over Martin Bennett's sawfly image and recognised it as *Lophyrotoma zonalis.* He mentioned that it was on the short list for transport to the Florida Everglades to combat our Aussie *Melaleuca quinquenervia* paperbark which had infested their wetlands and become a serious weed. However, it was never released, partly because the larvae contain toxins (Lyphyrotoxin & Pergidin) that caused authorities in the USA to have concerns about the possibility of poisoning migratory birds!
There is a photo of it on p159 of the revised edition of *Wildlife of Greater Brisbane* erroneously captioned *Pterygophorus insignis*. Matt differentiates the two species thus: "*L. zonalis* has the wide gold abdominal band whereas *P. insignis* has a smaller gold band and a second thin band nearer the tip of the abdomen."
Tim Heard, also with the CSIRO and one of our members (specialising in native stingless bees), also recognised it as *L. zonalis.* We thank them both for taking the time to assist us with this enquiry. *John Moss*

Left: *Lophyrotoma zonalis* – Photo Martin Bennett
Above: *Pterygophorus insignis* - Photo Matthew Purcell

FACEBOOK

Attention Facebook users! – *Alisha Steward*
Recent changes to Facebook and the introduction of the new 'timeline' format have somehow resulted in the removal of most of BOIC's 'friends'. I have no idea how this happened. Please re-friend/like/join if possible!
Now that my PhD is coming to an end I will have more time to post onto Facebook. I'll also update it as often as I can with details of upcoming club field trips and excursions. Please let Alisha Steward know if you have any questions: a.steward@griffith.edu.au

OTHER GROUPS' ACTIVITIES

Woodfordia's Butterfly Project - join the regular working bee at Woodfordia, every last Sunday, from 8.30am in conjunction with the TreeHuggers. The project works to enhance the Festival site for biodiversity, especially butterflies and other invertebrates. Contact Helen: butterflies@woodfordia.com , or phone 0423 127 492.

BUTTERFLY AND OTHER INVERTEBRATES CLUB PROGRAMME

Excursion to West Bellthorpe – 13th/14th October, 2012
The club will be having an excursion to West Bellthorpe, north of Woodford in the Conondale Ranges, on the weekend 13/14 October in company with members of Brisbane Rainforest Action and Information Network (BRAIN). Activities will include a botanical and entomological survey of Branch Creek and environs, as well as the setting up of UV light insect attractant sheets (adjacent to the old timber mill and ex-forestry complex) in the evening. As accomodation is limited and both Griffith Uni (the lessee) and QP&WS have certain new requirements, it is essential to register expressions of interest with John Moss (07-32452997 or johntimmoss@gmail.com).

Planning Meeting 10th November 2012

Excursion to Kalbar – 24th/25th November, 2012
Aubrey Podlich, club member and local naturalist from Boonah, has invited members to visit his 43 acre "softwood vine scrub" near Kalbar on the weekend 17/18 November. Some of the local Fassifern Field Nats may guide us around. Activities will include identification of butterfly and moth hostplants as well as recording insects to add to his list of ~45 butterflies. It is likely that mercury vapour generated UV lights will be set up in the evening to attract beetles, cicadas, moths and other insects. It may be possible for the die-hards to camp overnight on site to monitor the light trap. Details, including directions, meeting time and place will be available on registering with John Moss on 07-32452997 (or johntimmoss@gmail.com).

An afternoon identifying moths, concentrating on the Crambidae
What: Calling upon serious studiers and collectors of Lepidoptera, in particular moths. Bring along your unnamed Crambidae and see if together we can name them. A light trap will be run in the evening for those who wish to stay. If you are staying bring something for a BBQ. Extras and afternoon tea will be provided.
When: **Saturday 1st December, 2012** starting at 1.00 pm till late.
Where: Peter Hendry's home at Sheldon (contd.)

RSVP: You must book a place. Directions will be provided. Please ring Peter on 3206 0048 between 2:00pm and 7:30pm weekdays.

DISCLAIMER

The magazine seeks to be as scientifically accurate as possible but the views, opinions and observations expressed are those of the authors. The magazine is a platform for people, both amateur and professional, to express their views and observations about invertebrates. These are not necessarily those of the BOIC. The manuscripts are submitted for comment to entomologists or people working in the area of the topic being discussed. If inaccuracies have inadvertently occurred and are brought to our attention we will seek to correct them in future editions. The Editor reserves the right to refuse to print any matter which is unsuitable, inappropriate or objectionable and to make nomenclature changes as appropriate.

ACKNOWLEDGMENTS

Producing this magazine is done with the efforts of:

- Those members who have sent in letters and articles
- Andrew Atkins who provided the cover painting
- Daphne Bowden who works on layout, production and distribution
- John Moss for scientific referencing and proof reading of some articles in this issue of the magazine
- Printing of this publication is proudly supported by Brisbane City Council

We would like to thank all these people for their contribution.

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Butterfly and Other Invertebrates Club Inc.
PO Box 2113
RUNCORN Q. 4113

Next event – Excursion to West Bellthorpe – 13th/14th October, 2012